

Conference Abstract

The Information Content of Biodiversity Datasets is Affected by Patterns of Citizen Science Participation both Between and Within Projects

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Abstract

Citizen science is a powerful way to undertake monitoring of biodiversity, both for detecting rare events (e.g. invasive species, animal and plant health issues or presence of rare species) and assessing trends. However, in order to use citizen science effectively we need to understand better the patterns of people's participation in projects considering

1. variation in participation between citizen science approaches and
2. individual variation in participation within a project.

Here, we particularly focus on the information content of the data collected through citizen science (although we recognise that citizen science has many other benefits, in addition to data collection).

Firstly, we assessed participation in five projects for biodiversity monitoring in the UK, from mass participation to monitoring by volunteer experts, representing up to two thousand people per activity per year. We quantified the patterns of participation (in terms of retention of participants, spatial patterns of participation, and unevenness of contributions per participant - as in the 90:10 rule). We found that the data from mass participation projects were more strongly spatially correlated with human population density and

retention of individuals was lower compared to projects targeted on those with existing interest in the subject.

Secondly, we quantified the recording behaviour of recorders in a butterfly citizen science project. We developed this with four thousand users of a smartphone app designed for recording sightings of butterflies in the UK. The majority of these users were active for less than 10 days, a feature common to many citizen science projects. The users who engaged for longer produced most of the records for the project. We characterised their recording behaviour using 11 metrics that describe the variation in temporal and spatial recording behaviour as well as the data they recorded. Results showed that citizen scientists in this project fall on a continuum along 4 main axes describing their behaviour. We then used a 20-year butterfly dataset to assess the contribution of different types of recorders to the overall estimate of biodiversity trends and their precision. Overall, variation in participation, both between projects and between individuals within projects, contributes to variation in the information content (and hence the usefulness) of citizen science datasets. We show how different approaches can provide data to meet different needs for data users and how this understanding can be used to improve analyses of these data, allowing us to better design citizen science activities in the future.

Keywords

citizen science, biodiversity, information content, participants, motivation, behaviour

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